

(12) UK Patent Application (19) GB (11) 2 351 682 (13) A

(43) Date of A Publication 10.01.2001

(21) Application No 0016570.4

(22) Date of Filing 05.07.2000

(30) Priority Data

(31) 9915851

(32) 06.07.1999

(33) GB

(51) INT CL<sup>7</sup>

B05D 1/32, B05B 15/04, B05D 1/06

(52) UK CL (Edition S)

B2L LCVA

B2E EBA E1103 E1205 E1730

U1S S1808

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(56) Documents Cited

GB 2220871 A EP 0333146 A2 JP 590136165 A

JP 010231967 A

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(58) Field of Search

UK CL (Edition R) B2E EAG EBA, B2L LCDE LCVA

INT CL<sup>7</sup> B05B 15/04, B05C 21/00, B05D 1/04 1/06

1/32

On-line: WPI, EPDOC, JAPIO

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(54) Abstract Title

Electrostatic coating of bottles or the like

(57) A conductive annular mask member 14 is fitted over the rim of the base of an inverted bottle B and masks the rim during electrostatic paint deposition from a spray head 17. The resulting layer L has a sharp edge. A cardboard tube 13 protects the sidewall 2 of the bottle. The mask member 14 masks the rim by an electrostatic as well as a physical effect.

The bottle B may be plastics, ceramics or glass.

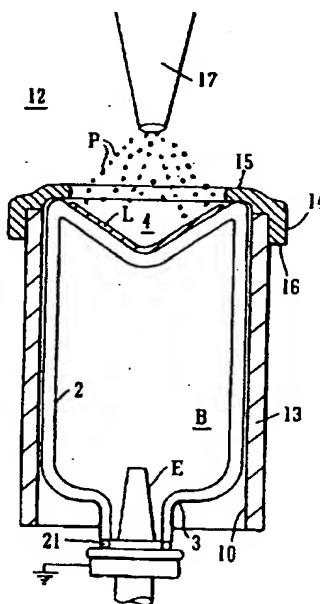
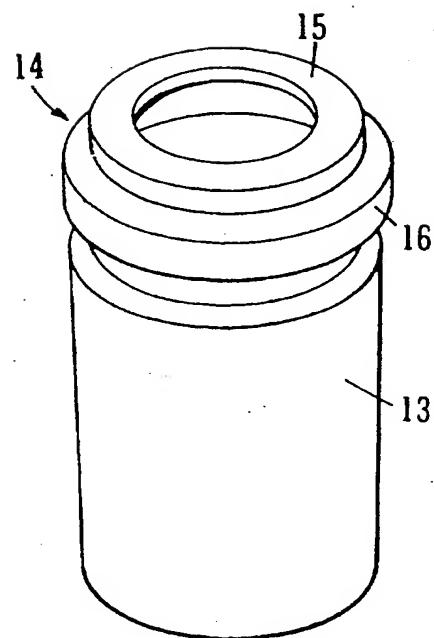
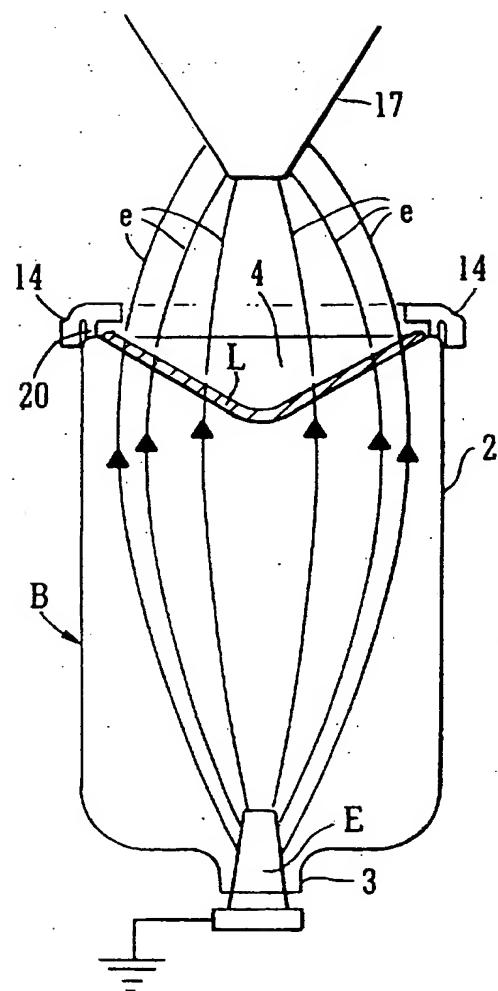


FIG. 3

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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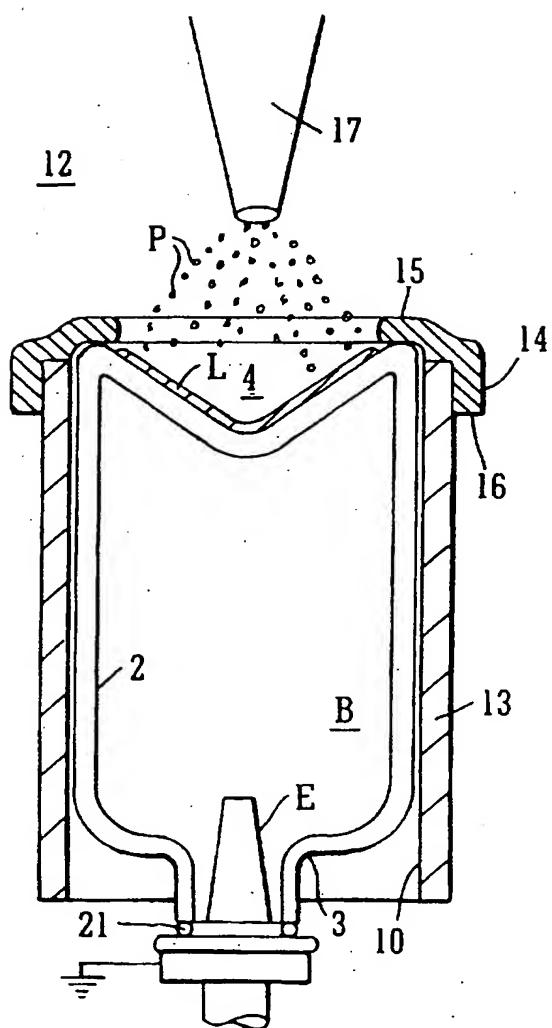


FIG. 3

COATING METHOD AND APPARATUS

The invention relates to a method and apparatus for applying a coating composition to form a coating, typically a paint on to a substrate. In particular, the invention relates to a method and apparatus which coats a selected surface area only, leaving adjacent areas free of the coating. The substrate may be a receptacle in say glass or plastics or ceramics, e.g. bottles, drinking glasses, tumblers, tableware in general.

In one aspect the invention provides a method of spraying a coating on a selected surface region of an insulating or poorly conducting substrate wherein sprayed coating material is attracted to said surface region by an electrostatic field and a conducting member is disposed in the electrostatic field adjacent said selected surface region and arranged to mask the surface region of said substrate bordering said selected surface region.

The invention has the advantage over other masking arrangements that a sharp boundary between coated and uncoated areas is formed.

Preferably the conducting member is in the form of a plate overlying said bordering surface region.

Preferably said conducting member is generally spaced apart from said bordering surface region.

Preferably said conducting member is interposed between said substrate and said sprayed coating material.

Preferably said substrate is composed of glass, plastics or ceramic material.

Preferably said substrate is in the form of a container, said conducting member is disposed on or immediately adjacent the outer surface of the container wall and said electrostatic field extends through the container wall.

In a preferred embodiment the substrate is a bottle, vessel or other receptacle, the bottle is inverted so that the base is uppermost, and the conducting member comprises an annulus covering the perimeter of the base. Preferably the conducting member has a skirt which extends outwardly and downwardly, and a cylinder extends from within the skirt to the neck of the bottle, whereby the bottle is masked save for the base to be coated. Preferably the annulus is formed of steel, and the annulus and the skirt are formed in one piece. The cylinder can be formed of cardboard for example, and is preferably disposable.

Typically the base of the bottle has an inwardly extending depression which is the selected surface area.

In an alternative, other surface areas can be selected for coating, e.g. the neck of the bottle.

In another aspect there is provided apparatus for spraying a coating on a selected surface region of an insulating or poorly conducting substrate, the apparatus comprising:

- a) means for generating an electrically charged spray of coating material;
- b) means for locating the substrate in the path of said electrically charged spray;
- c) electrode means arranged to establish an electrostatic field passing through said selected surface region, and
- d) an electrically conducting member which in use is disposed in the electrostatic field adjacent said selected surface region and arranged to mask the surface region of said substrate bordering said selected surface region.

Preferably said conducting member is in the form of a generally annular plate.

Further preferred features are defined in the dependent claims.

The invention extends to the product of the claimed method, e.g. a bottle the base of which has been coated by any method as disclosed herein.

The coating composition may for example be a water based or resin solvent based composition.

In order that the invention may be well understood a preferred embodiment will now be described by way of illustration only, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is an elevation showing the shielding effect of a conductive member on the face of an inverted bottle during electrostatic spraying;

Figure 2 is a perspective view of the conductive member of Figure 1 and an associated cylinder, and

Figure 3 is an elevation in section of a bottle, the base of which is being coated.

As shown in Figure 1, a bottle B has a sidewall 2 and a neck 3. The base of the bottle has an inward depression 4. The depression 4 has a coating L of coloured paint formed by electrostatic spraying from a rotary atomiser 17. In one particular example the wall of the bottle is transparent, and the colour to be applied to the depression is intended to convey to a purchaser the flavour of the intended contents of the bottle, e.g. vodka.

As shown in Figure 1, the bottle B is inverted and an insulated earthed electrode E protrudes upwardly into its neck 3. An electric field is established between electrode E and a negatively charged spray head 17 (in the form of a rotary atomiser) which is directed downwardly towards a depression 4 in the base of the bottle. The electric field is represented by lines of force e.

A conductive mask member 14 in the form of an annulus rests or is otherwise supported on the rim portion of the base of the bottle and serves to mask the rim portion.

Accordingly, paint droplets are guided to the central region of the depression and form a paint layer L. Without being bound by theory, it is believed that the conductive mask member 14 acts both electrically (by modifying the electric field so that the charged paint droplets are attracted to the inner boundary of mask member 14) and by physically shielding the rim portion of the base of the bottle. In this embodiment the mask member is slightly spaced apart from the upwardly facing outer surface of the bottle base, e.g. by projections 20 which extend downwardly from the mask member and rest on the rim portion of the base of the bottle.

As best seen in Figure 2, the conductive mask member (which is preferably of spun steel sheet of thickness 1 mm or less) has an annular ledge or shoulder portion 15 and a depending skirt 16. A disposable tube 13 of cardboard or other lightweight material is fitted into skirt 16 (as shown in Figure 3) to protect the sidewall 2 of the bottle.

Referring to Figure 3, the inverted bottle B, partially covered by conductive mask member 14 and tube 13 and supported on an O-ring 21 which is interposed between the rim of its neck 3 and an insulating ledge portion of electrode E, is conveyed with similarly protected bottles, by a conveyor (not shown) to a coating station 12.

The conveyor 11 passes the bottle (in line with other such bottles) to the coating station 12 at which a rotary atomiser 17 sprays negatively charged paint particles P of composition. The particles are attracted to the depression 4 and fall to form the coating L. The inner perimeter of the annulus 15 concentrates the charge and hence the attraction to the depression 4 to be coated. (Excess particles P fall on to the annulus to

coat that and can be removed later.) The conveyor advances and the components 13 and 14 of the mask assembly are removed. The conductive mask member 14 and tube 13 have shielded the surface areas of the bottle which are not to be coated and the boundary of painted layer L is sharply defined.

CLAIMS

1. A method of spraying a coating on a selected surface region of an insulating or poorly conducting substrate wherein sprayed coating material is attracted to said surface region by an electrostatic field and a conducting member is disposed in the electrostatic field adjacent said selected surface region and arranged to mask the surface region of said substrate bordering said selected surface region.
2. A method according to Claim 1 wherein the conducting member is in the form of a plate overlying said bordering surface region.
3. A method according to Claim 1 or Claim 2 wherein said conducting member is generally spaced apart from said bordering surface region.
4. A method according to any of Claims 1 to 3 wherein said conducting member is interposed between said substrate and said sprayed coating material.
5. A method according to any preceding claim wherein said substrate is composed of glass, plastics or ceramic material.
6. A method according to any preceding claim wherein said substrate is in the form of a container, said conducting member is disposed on or immediately adjacent the outer surface of the container wall and said electrostatic field extends through the container wall.

7. A method according to Claim 6 wherein an electrode used to generate said electrostatic field extends through an opening in said container towards said selected surface region.
8. A method according to any preceding claim wherein said conducting member is generally annular and surrounds said selected surface region.
9. A method according to Claim 8 wherein a further shield is provided which cooperates with the annular conducting member to shield regions of said substrate other than said selected surface region from said sprayed coating material.
10. A method according to Claim 9 wherein said further shield is formed of insulating material.
11. A method according to Claim 9 or Claim 10 wherein said further shield is removably attached to said conducting member.
12. A method according to Claim 6 or any of Claims 7 to 11 as dependent upon claim 6 wherein said container is a bottle or jar having a depression in its base and said selected surface region is located in said depression.
13. A method of spraying a coating substantially as described hereinabove with reference to Figures 1 to 3 of the accompanying drawings.

14. Apparatus for spraying a coating on a selected surface region of an insulating or poorly conducting substrate, the apparatus comprising:

- a) means for generating an electrically charged spray of coating material;
- b) means for locating the substrate in the path of said electrically charged spray;
- c) electrode means arranged to establish an electrostatic field passing through said selected surface region, and
- d) an electrically conducting member which in use is disposed in the electrostatic field adjacent said selected surface region and arranged to mask the surface region of said substrate bordering said selected surface region.

15. Apparatus according to Claim 14 wherein said conducting member is in the form of a generally annular plate.

16. Apparatus substantially as described hereinabove with reference to Figures 1 to 3 of the accompanying drawings.



Application No: GB 0016570.4  
Claims searched: 1-16

10 Examiner: Rhys Williams  
Date of search: 6 November 2000

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): B2E (EAG, EBA) B2L (LCDE, LCVA)

Int Cl (Ed.7): B05B (15/04) B05C (21/00) B05D (1/04, 1/06, 1/32)

Other: On-line: WPI, EPDOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2220871 (HYDRALON) See figures 1-3 and page 2 lines 32 - page 3 line 7.	1, 4 and 5
X	EP 0333146 A2 (GRACE) See page 2 lines 4-7.	1
X	JP 1231967 (HONDA) See PAJ abstract.	1 at least
X	JP 59136165 (TOA) See PAJ abstract.	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.